

Microelectromechanical System-Based Internally Unpowered Leak-Pressure Sensor, Phase I

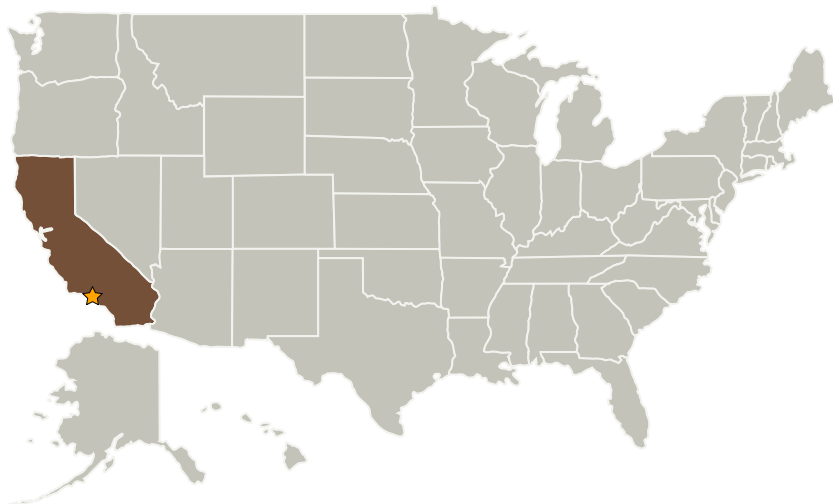
Completed Technology Project (2006 - 2006)



Project Introduction

To address the NASA need for a miniature pressure-leak sensor, Physical Optics Corporation (POC) proposes to develop a new Microelectromechanical System-based Internally Unpowered Sensor (MEMIUS). Fabrication of MEMIUS involves integration of a small MEMS piezoresistive sensor with proprietary miniature electronics and a novel wireless power transfer mechanism for device power-up and data read-out for a miniature footprint (2 cm x 2 cm x 1 cm, < 20 g weight). MEMIUS can be applied to both nonshielding and metal alloy shielding containers by utilizing inductive coupling with a small, efficient antenna, or a dual-band sensor antenna mounted on metal with a feed-through capacitor. MEMIUS represents an accurate pressure-leak sensor (~0.01 mbar) with no-battery on board electronics. It operates at low-temperatures with remote and efficient wireless power transfer capabilities at variable distances (1-10 m). These specifications are critical to the NASA search for an extremely rugged power efficient pressure sensor less than 5 cu. cm operating from -70 deg. C to +20 deg. C. The proposed MEMIUS thus solves the problems of weight, size, power efficiency, shielding, and electromagnetic interference. The Phase I effort will demonstrate MEMIUS feasibility, and confirm its ruggedness and sensitivity. In Phase II POC will develop an advanced MEMIUS prototype.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Physical Optics Corporation	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
 - └ TX04.2 Mobility
 - └ TX04.2.2 Above-Surface Mobility